

REMARKS

The Examiner's Action mailed on September 12, 2007, has been received and its contents carefully considered. Additionally attached to this Amendment is a Petition for Two-month Extension of Time.

In this Amendment, Applicant has amended claims 1 and 16, and added claims 20-23. Claims 1-8, 10-11, 13-14, and 16-23 are pending in the application, while claims 2-8 and 11, 13-14 are withdrawn from consideration. Claims 1 and 16 have been amended to add features supported by the specification at page 19, lines 11, through page 20, line 6, and page 24, line 27, through page 25, line 2, and Figure 2(B). New claims 20 and 23 are also supported by Applicant's Figures 1, 2(B) and 3(A)-3(C). Claims 1 and 16 are the independent claims. For at least the following reasons, it is submitted that this application is in condition for allowance.

The Examiner's Action rejects claims 1, 16, 18 and 19 as being obvious over *Ogawa* (USP 4,418, 284) in view of *Honda* (US Pat. Pub. No. 2002/0064935). It is respectfully submitted that the invention now defined by these claims is clearly patentable over the cited references for at least the following reasons.

Amended claim 1 is directed to a semiconductor device which includes, *inter alia*, an insulating film, a light-transmitting portion, wiring patterns, post portions, a sealing layer, and external terminals. The insulating film is provided over a main surface of a semiconductor chip so as to expose surface portions of first pads. The wiring patterns extend from the surface portions of the first pads and over the insulating film. The claim recites that the sealing layer is provided on the wiring patterns, on the insulating film, on a side surface of the light-transmitting portion, and on surfaces of the post

portions, such that an upper surface of the light-transmitting portion and top surfaces of the post portions are exposed. The claim further recites that the sealing layer has cut side surfaces which are substantially in the same plane of side surfaces of the semiconductor chip. This claimed invention is not disclosed or suggested by the cited references.

Ogawa discloses a solid-state color-image sensor with a light-shield layer covering desired portions so as to prevent noise. However, as is noted by the Examiner, *Ogawa* does not disclose or suggest the insulating film, the wiring patterns, the post portions, the sealing layer, and the external terminals, as recited in claim 1.

To overcome the above-admitted deficiencies, the Examiner relies on the teachings from *Honda*. *Honda* is directed to a semiconductor device which includes a semiconductor substrate 11, an electrode pad 12, a passivation film 13, an electrode pad bonding metal layer 21, an electroplating electrode metal layer 22, a rewiring pattern portion 24a, a metal-made circular columnar member 30, and a resin layer 27 (see *Honda*, paragraphs [0036], [0037], [0041], [0064] and [0065], Figures 2A, 2B, 2G, 4B, 4C and 4F).

The Examiner equates the resin layer 27 disclosed by *Honda* with the claimed sealing layer, if bonding pads 6 disclosed by *Ogawa* are modified in view of the pad 12 of Figure 4F of *Honda* and *Honda*'s corresponding interconnection details. However, *Ogawa* teaches away from being modified in view of *Honda*'s pad 12 and corresponding interconnection details. *Ogawa* aims to solve a drawback of the prior art, that pads are covered by an adhesive that may be cured over the pads, so that no fine lead wires can be bonded to the pads in a packaging step (see *Ogawa*, col. 3, lines 56-

61, Figure 2). *Ogawa* solves such a drawback by preventing bonding pads 6 from being covered by a resin layer 13 by masking the pads 6 so that the adhesive, i.e., the resin layer 13, may be readily removed with a suitable organic solvent (see col. 4, lines 39-43, Figure 3).

However, each of the pads 6 disclosed by *Ogawa* is still a bonding pad to which the fine lead wires can be bonded in the packaging step. Thus, although *Ogawa's* image sensor aims to overcome the drawback of wire-bonding type image sensor, *Ogawa's* image sensor is still a wire-bonding type image sensor similar to Applicant's admitted prior art of wire bonding type (see the specification, page 2, lines 2-4). External terminals that may be connected to the pads 6 by the fine lead wires of *Ogawa*, appear to be located outside the chip 15. Accordingly, *Ogawa* teaches away from being modified in view of *Honda's* pad 12 and corresponding interconnection details. Thus, the resin layer 27 disclosed by *Honda* is not equivalent to the claimed sealing layer.

In addition, because the semiconductor device disclosed by *Honda* does not include any light-transmitting element portion, as recited in claim 1, and because *Ozawa* cannot be modified to incorporate *Honda*, there is no disclosure or suggestion that the resin layer 27 disclosed by *Honda* is provided on the light-transmitting portion, as recited in claim 1. Moreover, *Honda* does not disclose or suggest any structural configuration of the resin layer 27 relative to additional elements (e.g., the glass substrate 7 disclosed by *Ozawa*). Thus, even assuming that the resin layer 27 disclosed by *Honda* is incorporated into *Ozawa*, there is still no disclosure or suggestion that the resin layer 27 disclosed by *Honda* is provided on a side surface of the light-

transmitting portion such that an upper surface of the light-transmitting portion is exposed, as would be required by amended claim 1.

Accordingly, *Honda* fails to disclose or suggest the sealing layer, as recited in claim 1. It is thus submitted that Applicant's independent claim 1, and claim 19 that depends from claim 1, are *prima facie* patentably distinguishable over the cited references.

Claim 16 also recites a light-transmitting member, an insulating film, a wiring pattern over the insulating film, a post electrode formed on the wiring pattern, an external terminal formed on a top surface of the post electrode, and a sealing layer. The claim recites that the sealing layer is formed on side surface of the light-transmitting member, such that an upper surface of the light-transmitting member is exposed. The claim further recites that the sealing layer surrounds a side surface of the light-transmitting member. Because claim 16 recites above-noted features similar to those recited in claim 1, independent claim 16, and claim 18 that depends from claim 16, are allowable for at least the same reasons as claim 1, as well as for the additional features recited therein.

The Examiner's Action also rejects claims 10 and 17, as being obvious over *Ogawa* in view of *Honda*, and further in view of *Lanford* (USP 5,959,358). Because *Lanford* does not overcome the above-noted deficiencies of *Ogawa* and *Honda*, and because claims 10 and 17 depend respectively from independent claims 1 and 16, it is submitted that claims 10 and 17 are *prima facie* patentably distinguishable over the cited references for at least the same reasons as independent claims 1 and 16, as well

as for the additional features recited therein. It is requested that claims 10 and 17 be allowed and that this rejection be withdrawn.

Because new claims 20-23 depend respectively from independent claims 16 and 1, it is submitted that these claims are *prima facie* patentably distinguishable over the cited references for at least the same reasons as independent claims 16 and 1, as well as for the additional features recited therein.

In addition, claims 20 and 22 further recites that a wiring pattern extends over the insulation film, and physically and directly contacts the surface portions of the first pad. The Examiner equates the rewiring pattern portion 24a disclosed by *Honda* with the claimed wiring pattern. However, the rewiring pattern portion 24a disclosed by *Honda* is disposed on an electrometal film 22 that is disposed on an electrode pad bonding metal layer 21 (see paragraphs [0040] - [0044], Figures 4A-4F). The electrode pad bonding metal layer 21 disclosed by *Honda* is formed on electrode pads 12, and physically and directly contacts the electrode pads 12 (see paragraphs [0040], Figures 4F). Accordingly, the rewiring pattern portion 24a disclosed by *Honda* does not physically and directly contact the surface portion of the electrode pads, as would be required by claims 20 and 22. It is thus requested that claims 20 and 22 be allowed.

Claims 21 and 23 further recites that the wiring pattern is uniformly spaced apart from the first main surface of the semiconductor chip. The Examiner equates the rewiring pattern portion 24a disclosed by *Honda* with the claimed wiring pattern. However, the rewiring pattern portion 24a disclosed by *Honda* has a concave portion formed between inner walls of opening sections 20a (see paragraph [0040], Figure 2F and 4F). Accordingly, the distance of the concave portion of *Honda's* pattern portion

24a from a surface of the semiconductor substrate 11 is smaller than the distance of other parts of the pattern portion 24a from the substrate 11. Thus, the rewiring pattern portion 24a disclosed by *Honda* is not uniformly spaced apart from a main surface of the semiconductor substrate 11. It is thus requested that claims 21 and 23 be allowed.

It is thus submitted that this application is in condition for allowance. Such action and the passing of this case to issue are requested.

Should the Examiner feel that a conference would help to expedite the prosecution of the application, the Examiner is hereby invited to contact the undersigned counsel to arrange for such an interview.

An extension fee is submitted herewith. Should the fee be missing or in an inadequate amount, the Commissioner is hereby authorized to charge the fee or underpayment to our deposit account No. 18-0002, and is requested to notify us accordingly.

Respectfully submitted,



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Date

Robert H. Berdo, Jr.
Registration No. 38,075
RABIN & BERDO, PC
Customer No. 23995
Telephone: 202-371-8976
Facsimile: 202-408-0924

RHB/JJ